POSTER SESSION

1019 Catheter Closure of Atrial Septal Defects

Sunday, March 07, 2004, 9:00 a.m.-11:00 a.m.
Morial Convention Center, Hall G
Presentation Hour: 9:00 a.m.-10:00 a.m.

1019-199 Anatomic Interaction Between the Aortic Root and the Atrial Septum: An Echocardiographic Prospective Study

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Background : Platypnea-orthodeoxia syndrome is a rare pattern of dyspnea that may be observed with atrial right-to-left shunting (RLS). A few cases have been reported in association with an aortic aneurysm, but no documented pathophysiological explanation has been proposed.
Methods : We studied 72 consecutive patients (mean age 66.2 ± 10, 68% males) referred for pre-operative assessment of either an aortic valve disease or an aneurysm of the ascending aorta. During catheterisation, a careful search for a patent foramen ovale (PFO) was performed. During multiplane transesophageal echocardiography we measured : maximal diameter of the ascending aorta (AoD), minimal atrial septal dimension (ASd) at the level of the aortic root, and maximal oscillation amplitude of the atrial septum (ASo) (4 patients with an atrial septal aneurysm were excluded). A PFO was sought by contrast infusion through a brachial vein and through the femoral vein, and the RLS was categorized as grade 1, 2 or 3. The relationships between AoD, ASd, and ASo were studied. In patients with a PFO, we looked at the relationship between RLS grade and ASo.
Results :
Mean AoD was 43.4 ± 9 mm (range 30-64) . A PFO was found in 26% of the patients

Correlation study	r	p
AoD / ASd	-0.49	<0.002
AoD / ASo	0.24	0.041
ASd / ASo	-0.37	<0.002
In 19 patients with a PFO		
ASo / RLS grade	0.52	0.038

Interpretation: These results demonstrate that a dilatation of the aortic root significantly affects the atrial septal morphology by reducing its apparent size, decreasing its tautness, and increasing its mobility. The increased septal mobility appears to be an important risk factor for RLS in the presence of a PFO.

1019-200 Migraine Relief Following Transcatheter Closure of Patent Foramen Ovale

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Background: Current theory suggests that right-to-left shunt (RLS) through a patent foramen ovale (PFO) permits paradoxical microemboli and neuromediators to bypass lung filtration thereby potentially triggering migrainous aura. The purpose of this study was to determine if transcatheter PFO closure in migraineurs is associated with a reduction in migraine frequency.
Methods: Between July 2001 and 2003, 120 patients underwent transcatheter PFO closure to prevent recurrent cryptogenic stroke or transient ischemic attack. According to criteria defined by the International Headache Society, 42% (50/120) of patients experienced active migraine symptoms and 28% (34/120) of those reported migrainous aura. Following PFO closure, patients were serially evaluated to assess residual RLS and migraine frequency. Contrast transcranial Doppler was used to measure microembolic signals during normal respiration and during calibrated (40 mmHg) respiratory strain. The mean time of follow-up was 4 months after PFO closure.
Results: Migraineurs with aura (n = 23) experienced a mean reduction in migraine frequency from 7.8 ± 10.9 (pre-closure) to 1.7 ± 4.7 (post-closure) events monthly (p <.01). Migraineurs without aura (n = 9) reported a clinically important reduction in migraine frequency from 11.8 ± 12.7 (pre-closure) to 3.4 ± 8.1 (post-closure) events monthly (p = .07). Overall, 42% (21/50) of migraineurs experienced complete resolution of migrainous symptoms. Additionally, 5 (10%) patients reported a substantial (> 50%) reduction and 2 (4%) patients reported a partial (< 50%) reduction in migraine frequency. Only 5 (10%) patients reported no reduction in migraine frequency following PFO closure. A significant reduction in RLS was observed following PFO closure in migraineurs with and without aura (N = 44), during normal respiration (146 ± 128 vs. 22 ± 63, p < .01) and with calibrated strain (270 ± 65 vs. 92 ± 125, p < .01). Complete closure without residual RLS was achieved in 61% (27/44) of patients.
Conclusion: Transcatheter PFO closure results in significant reduction in migrainous events. The mechanism of this causal effect warrants further investigation.

1019-201 Device Closure of Atrial Septal Defect After the Fifth Decade of Life: Beneficial Effect on Symptoms and Ventricular Function

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Background: The majority of secundum atrial septal defects (ASD) can be closed by transcatheter techniques. The benefit in older patients remains unclear.
Aim: We assessed the effect of device closure of ASD on symptoms and ventricular function in patients > 50 years of age.
Methods: Symptoms, right and left heart size and function were assessed at baseline and 2-18 months post ASD device closure in 20 patients (13 female, mean age 63 (range 50-78) years).
Results: All defects were closed using an Amplatzer septal occluder. Mean (range) stretched diameter was 24 mm (16-40)and device size 26.7mm (18-40). Device closure was succesful in all patients with no residual leaks. Eighteen patients reported symptomatic improvement following the procedure. This was associated with a significant reduction in right atrial transverse diameter (5.5±0.9 to 4.5±0.9 cm, p<0.001) and right ventricle inlet diameter (5.1±0.9 to 3.8± 0.7 cm, p<0.05). Peak pulmonary flow velocity also fell from 115±30 to 90±16 cm/s, p<0.01, . In contrast left ventricular end-diastolic dimension increased from 4.1±0.6 to 4.6± 0.5 cm, p<0.001, while aortic velocity increased from 105± 25 to123±25 cm/s, p<0.001 consistent with increased left ventricular filling and systemic cardiac output. The 2 patients who reported no change in symptoms despite successful device implantation both had evidence of coronary artery disease. In them, the left ventricle was at the upper limit of normal before procedure and dilated further post ASD closure while the left atrium was already dilated before procedure (>5 cm) and increased further in diameter during follow-up. Left ventricular filling demonstrated signs of raised left atrial pressure before procedure (short isovolumic relaxation time and dominant E wave with short deceleration time <120 ms) and became more restrictive afterwards.
Conclusion: The majority of older patients report symptomatic improvement following device closure of ASD. This is associated with right ventricular remodelling and increased systemic cardiac output. However, benefit may be limited in patients with left ventricular dysfunction that could be masked by the ASD.

1019-202 Effect of Rim Deficiency and Occluder Size on Acute and Mid-Term Results of Transcatheter Atrial Septal Defect Closure in Adults

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Background: Although a rim of ≥ 5mm around the defect was originally considered mandatory for transcatheter atrial septal defect (ASD) closure, defects with < 5mm rim to the aorta are now accepted. Whether this may be associated with damage of the aortic wall, a higher likelihood of residual shunt, aortic regurgitation (AR) or other unfavorable effects especially when using larger sized occluders has not been studied.
Methods: All pts in whom ASD closure was attempted between 1998 and 2002 were included (n=111, 80 female, 52±17yrs, Amplatzer occluder, mean follow-up [FU] 2.2±1.2 yrs). Sufficient rim was present in 36 pts. (group A), 48 pts. (group B) had only a small rim < 5mm to the aorta and 27 pts. had no rim to the aorta (group C). FU studies were performed at 3, 6 and 12 months and every year thereafter.
Results: The procedure was successful in all pts. (occluder size 25±5mm, range 9 to 35mm). No major complications occurred. Minor complications were: transient ST-elevation (2), transient AV block (1) and transient SVT (4). At last FU, no relevant residual shunt was present in any pt., while 5 pts. (group A: 3; group B:2) had mild shunts (Qp:Qs ≤ 1.3). Mild AR was present in 20 pts. prior to intervention. In only 1 pt. an increase to mild-to-moderate AR was found (group B). Six pts. (group A: 3; group B: 2; group C: 1) presented with a new finding of trace or mild AR at FU. Mild mitral regurgitation (MR) was common prior to intervention (71 pts.). In 4 pts. an increase to mild-to-moderate MR was observed (group A:1; group B: 3). Trace MR was an inconsistent finding disappearing in 6 pts. and occurring in 17 pts. (group A: 6; group B: 7; group C: 4). No aortic complications were observed. The only adverse events observed during FU were transient palpitations and the occurrence of atrial fibrillation (group A: 2; group B: 4; group C: 3). The occluder size was not related to any of these observations.
Conclusion: ASDs with small and even missing rim to the aorta can safely be closed with Amplatzer occluders. Neither a deficient rim to the aorta nor the use of larger occluders appears to result in an increased likelihood of residual shunt, of the occurrence or worsening of AR and MR or of other adverse events.

1019-203 Stability of the Amplatzer Septal Occluder Device: Importance of the Atrial Tissue Rim

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Background: Percutaneous closure of secundum atrial septal defects (ASD) with the Amplatzer Septal Occluder device requires an adequate rim of septal tissue to stabilize the device. The amount of septal tissue and atrial rim necessary for stabilization has not been quantified.
Methods: An artificial ASD was created in fresh autopsied hearts through a right atrial incision. ASDs (12 to 40 mm in diameter) were created and 9 sizes of Amplatzer (12 through 40mm) were inserted. The force required to pull these devices through the ASD was measured in 260 attempts with a handheld ergometer. In 9 hearts, sequential 30-degree segments of atrial rim 7 mm wide were removed, and the force required to pull the device through the atrial septum was re-measured.
Results: The force required to pull an Amplatzer device through a given ASD size with an